means of the two devices were almost similar in each direction except the vertical, lateral, and pitch directions (t-test, $p < 0.0001$), whereas the maximal deviations in the three directions were slight. The SDs were not statistically different in each direction except the lengthwise and roll directions (F-test, $p < 0.05$), although the SDs were small in the corresponding two directions for CID.

Conclusion: This study suggested that 3DID could show positional accuracy almost similar to that of CID. However, further investigation is needed for use in clinical practice.

OC-0272

A comparison of CTCAE version 3 and 4 in assessing oral mucositis in oral/oropharyngeal carcinoma

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Purpose or Objective: CTCAE version 3 is an observation based grading system for oral mucositis whereas version 4 is based on function and intervention. Although version 4 has been widely adopted in clinical trials there is limited data on its correlation with version 3 from which considerable radiobiological data has been derived. The purpose of this study was to assess the frequency of discrepancy between these two grading systems.

Material and Methods: Oral mucosal reactions of patients undergoing chemoradiation or radiation alone for oral or oropharyngeal cancer were graded by three radiation oncologists in weekly on treatment and post treatment clinics. CTCAE version 3 and 4 mucositis grading and patient factors were recorded prospectively. Differences in the rate of discrepancy were compared by time since the commencement of radiotherapy, synchronous agent and patient age.

Results: 485 measurements were recorded for 64 patients. Grading from version 3 and version 4 were equal in 270 (56 %) measurements. In the 215 (44%) measurements where version 3 and version 4 were not equal, discrepancies were seen in: Week 0-4 = 79/179 (44%); Week 5-8 = 60/163 (37%); > week 8 = 76/143 (53%) (p=0.02); patients receiving platinum agents = 113/316 (36%) or cetuximab= 48/70 (69%) (p<0.01); patients > 70 years = 26/57 (46%) or < 50 years = 21/68 (31%) (p=0.09).

Conclusion: Statistically significant discrepancies were seen when patients receiving platinum agents were compared with those receiving cetuximab and in those measurements performed following treatment completion. These initial results suggest that functional/interventional based grading systems should be used with care in dose escalation studies where the healing of acute mucositis may be related to subsequent late damage.

OC-0273

Including specific symptoms in clinical scoring: predictive modelling and nursing of swallowing pain

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Purpose or Objective: Acute esophagitis (AE) is a common side-effect of radiotherapy (RT) for lung cancer. Previous predictive modelling studies focussed on clinical criteria (such as CTC) for significant AE (such as G2 or higher). Our clinic uses an integrative patient care approach where Nurse-RTTs routinely monitor symptoms and provide nursing interventions to manage side-effects. Therefore, Nurse-RTTs include with clinical scoring a note of actual symptoms mentioned by the patient during consultations, such as swallowing pain (SP). A retrospective audit of 131 patients was used to examine correlative patterns for SP, and hence to develop predictive models for SP before the start of RT. We propose that a predictive model will facilitate nurse/RTT-led efforts to reduce the impact of SP on patient comfort, overall QoL and clinical workflow.

Material and Methods: An electronic journal audit was performed for patients commencing curative RT for lung cancer between January 2013 and March 2015. All NSCLC and SCLC patients were included, as well as various dose/fractionation, chemotherapy and medication schedules. Exported treatment plan DVHs were merged with nursing data. The highest score following weekly assessments of AE during radiotherapy was recorded, as was the appearance of SP and the time point at which it was mentioned. Predictive models of SP were developed using multivariable regression and machine learning algorithms.

Results: The most typical patient was treated for NSCLC at 60-66Gy normo-fractionated with concurrent chemotherapy. Acute esophagitis (CTC grade 1 or higher) was observed in 110/131 (84%) and patient-reported SP in 99/131 (76%). Pain medication prior to RT was marginally protective against SP but was not statistically significant in single-parameter analysis (OR 0.58, 95%CI 0.24–1.41, p=0.21). A strongly significant dose-volume response exists between SP and radiobiologically-adjusted dose to the hottest 1cc of the esophagus. Predictive models of SP with repeated cross-validation accuracy of 78-84% were developed (sensitivity 88-89%, specificity 48-75%). Trained machine learning models correctly predicted SP 76-84% of the time in an unseen validation cohort of 25 patients (sensitivity 94-100%, specificity 25-62%).

Conclusion: An integrative nursing care approach in the RT clinical workflow has been used to monitor symptoms and intervene for treatment-related pain. The risk of one particular patient-centred symptom, SP, can be sensitively predicted with nursing and treatment planning variables. A future nurse-led interventional study is planned, using predictive modelling for swallow pain, to examine the possible effects of pre-treatment pain-medication or corticosteroids on reducing dependence on additional pain medication.

OC-0274

Analysis of set-up errors in head and neck cancer treated with IMRT technique assessed by CBCT

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Purpose or Objective: The aim of this study was to investigate systemic set-up errors in head and neck (H&N) cancer treated with intensity modulated radiation therapy (IMRT) by kilovoltage (kV) cone-beam computed tomography (CBCT) evaluation.

Material and Methods: Between September 2014 and August 2015, 360 CBCT in 60 patients (pts) affected by histological confirmed H&N cancer treated with IMRT technique were analyzed. The majority of patients treated 45 (75 %) were male and only 15 (25%) were female; median age was 68 years (range 44-88 years). The type of head and neck cancer treated were, oropharynx , hypopharynx, nasopharynx, larynx , tonsil, oral cavity and parotid cancer. All patients underwent planning Computerized Tomography (CT) simulation on supine position on a GE LightSpeed RT 16 CT Simulator for 2.5 mm slice thicknesses. As immobilization system we utilized a head-shoulder thermoplastic mask (Easy Frame (Candor TM)). The CT data sets were transferred to the Focal and Varian Eclipse treatment planning system through DICOM network. The target delineation was contoured by one Radiation Oncologist and according to (ICRU62) the PTVs volumes were generated by adding a 3-mm margin in all directions to the respective CTVs. The prescribed dose was 66 Gy in 30 fractions delivered to GTVs, 54-63 Gy in 30 fractions to CTVs. The IMRT plans were created on the Varian Eclipse treatment planning system